

**UNITED STATES DISTRICT COURT  
DISTRICT OF VERMONT**

VERMONT FEDERATION OF  
SPORTSMEN'S CLUBS,

POWDERHORN OUTDOOR SPORTS  
CENTER, INC.,

JPC, INC. (D/B/A BLACK DOG SHOOTING  
SUPPLIES),

PAULE DAME, and

MARSHA J. THOMPSON,

Plaintiffs,

v.

MATTHWE BIRMINGHAM, Director of the  
Vermont State Police, in his Official and  
Personal Capacities,

CHARITY CLARK, Attorney General of the  
State of Vermont, in her Official and Personal  
Capacities, and

SARAH GEORGE, State's Attorney for  
Chittenden County, in her Official and  
Personal Capacities,

Defendants.

Civil Case No. 2:23-cv-00710

**EXPERT DECLARATION OF LUCY P. ALLEN**

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## **I. SCOPE OF ASSIGNMENT**

1. I have been asked by the Vermont Office of the Attorney General to address the following issues: (a) the number of rounds of ammunition fired by individuals using a gun in real-life self-defense and (b) the outcomes when large-capacity magazines are used in public mass shootings, including the associated number of casualties. NERA is being compensated for time spent by me and my team at standard billing rates and for out-of-pocket expenses at cost. NERA currently bills for my time at \$1,200 per hour. NERA's fees are not in any way contingent upon the outcome of this matter.

## **II. QUALIFICATIONS**

2. I am a Senior Managing Director of NERA Economic Consulting ("NERA"), a member of NERA's Securities and Finance Practice and Chair of NERA's Product Liability and Mass Torts Practice. NERA provides practical economic advice related to highly complex business and legal issues arising from competition, regulation, public policy, strategy, finance, and litigation. NERA was established in 1961 and now employs approximately 500 people in more than 20 offices worldwide.

3. In my over 25 years at NERA, I have been engaged as an economic consultant or expert witness in numerous projects involving economics and statistics. I have been qualified as an expert and testified in court on various economic and statistical issues relating to the flow of guns into the criminal market. I have testified at trials in Federal and State Courts, before the New York City Council Public Safety Committee, the American Arbitration Association and the Judicial Arbitration Mediation Service, as well as in depositions.

4. I have an A.B. from Stanford University, an M.B.A. from Yale University, and M.A. and M. Phil. degrees in Economics, also from Yale University. Prior to joining NERA, I was an Economist for both President George H. W. Bush's and President Bill Clinton's Council of Economic Advisers. My resume with recent publications and testifying experience is included as Exhibit A.

### III. SUMMARY OF FINDINGS

5. Regarding the number of rounds fired by individuals using a gun in self-defense, I analyzed almost 1,000 real-life incidents of self-defense and found that it is extremely rare for a person, when using a firearm in self-defense, to fire more than 10 rounds. In particular, I performed an analysis of 736 incidents in the NRA Armed Citizen database, as well as my own systematic analysis of 200 Factiva news stories from a random sample of approximately 4,800 news stories describing incidents of self-defense with a firearm and found only 2 incidents where more than 10 rounds were used.<sup>1</sup> In addition, I analyzed police data on almost 4,000 shooting incidents in Portland and found no incidents of self-defense with a firearm where the defender fired more than 10 rounds.

6. Regarding the outcomes when large-capacity magazines are used in public mass shootings, I analyzed almost 200 mass shootings from four different sources between 1982 and 2022 and found that: (1) large-capacity magazines are often used in mass shootings; (2) both injuries and fatalities were higher in mass shootings that involved large-capacity magazines than in other mass shootings; (3) it is common for offenders to fire more than 10 rounds when using a large-capacity magazine in mass shootings; and (4) the majority of guns used in mass shootings were obtained legally. These findings are consistent with other studies that have analyzed mass shootings, including studies based on alternate sets of mass shootings, covering different years and defining mass shootings somewhat differently.

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<sup>1</sup> Note that these two incidents with more than 10 bullets fired by the defender were added to the NRA Armed Citizen database after an earlier analysis that I had conducted of the database in another case that was cited and relied upon by the court. See *Kolbe v. O'Malley*, 42 F. Supp. 3d 768 (D. Md. 2014) ("Allen's use of the NRA database is appropriate and acceptable." The Court also found that "The defendants' expert, Lucy Allen, confirms that it is rare for a self-defender to fire more than ten rounds"). In addition, according to the news stories on these two incidents, the defenders did not appear to need to fire more than 10 shots to defend themselves. See "York County homeowner shoots at intruder," *NRA-ILA Armed Citizen*, December 12, 2016 and "Homeowner fired at intruders," *NRA-ILA Armed Citizen*, May 24, 2017.

## IV. OPINIONS

### A. Number of Rounds Fired by Individuals in Self-Defense

#### 1. Analysis of NRA Armed Citizen Database

7. Plaintiffs claim the “large-capacity magazines” covered by Vermont’s 13 V.S.A. § 4021 are commonly used for lawful purposes, including for self-defense.<sup>2</sup> Vermont’s 13 V.S.A. defines “large-capacity magazines” as magazines for long guns capable of holding more than 10 rounds and magazines for handguns capable of holding more than 15 rounds.<sup>3</sup>

8. The number of rounds commonly needed by individuals to defend themselves cannot be practically or ethically determined with controlled scientific experiments and there is no source that systematically tracks or maintains data on the number of rounds fired by individuals in self-defense. Due to these limitations, I have analyzed available data sources to estimate the number of rounds fired by individuals to defend themselves. In particular, I have analyzed data from the NRA Institute for Legislative Action, as well as my own study of news reports on incidents of self-defense with a firearm. In all, I have analyzed almost 1,000 incidents of self-defense with a firearm and found that it is extremely rare for a person, when using a firearm in self-defense, to fire more than 10 rounds.

9. The NRA maintains a database of “Armed Citizen” stories describing private citizens who have successfully defended themselves, or others, using a firearm (“NRA Armed Citizen database”). According to the NRA, the “Armed Citizen” stories “highlight accounts of law-abiding gun owners in America using their Second Amendment rights to defend self, home and family.”<sup>4</sup> Although the methodology used to compile the NRA Armed Citizen database of stories is not explicitly detailed by the NRA, the NRA Armed Citizen database is a useful data source in this matter for at least three reasons. First, the Armed Citizen database was the largest

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<sup>2</sup> See, for example, Complaint for Monetary, Injunctive, and Declaratory Relief, filed December 18, 2023 (“Complaint”), ¶¶6, 15.

<sup>3</sup> Complaint, ¶6. In this report, large-capacity magazines are defined as magazines capable of holding more than 10 rounds.

<sup>4</sup> NRA Institute for Legislative Action, Armed Citizen, <https://www.nraila.org/gun-laws/armed-citizen/>, accessed May 28, 2017.

collection of accounts of citizen self-defense compiled by others that I was able to find.<sup>5</sup> Second, the incidents listed in the Armed Citizen database highlight the very conduct that Plaintiffs claim the Vermont law impedes (*i.e.*, the use of firearms by law-abiding citizens for self-defense).<sup>6</sup> Third, the Armed Citizen database is compiled by an entity that actively opposes restrictions on magazine capacity and restrictions on the possession and use of firearms in general.<sup>7</sup> In light of the positions taken by the entity compiling the data, I would expect that any selection bias would be in favor of stories that put use of guns in self-defense in the best possible light and might highlight the apparent need of guns and/or multiple rounds in self-defense incidents.

10. My team and I performed an analysis of incidents in the NRA Armed Citizen database that occurred between January 2011 and May 2017.<sup>8</sup> For each incident, the city/county, state, venue (whether the incident occurred on the street, in the home, or elsewhere) and the number of shots fired were tabulated.<sup>9</sup> The information was gathered for each incident from both the NRA synopsis and, where available, an additional news story. An additional news story was found for over 95% of the incidents in the NRA Armed Citizen database.

11. According to this analysis of incidents in the NRA Armed Citizen database, it is extremely rare for a person, when using firearms in self-defense, to fire more than 10 rounds. Out of 736 incidents, there were 2 incidents (0.3% of all incidents), in which the defender was

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<sup>5</sup> Note that in 2020, after the time my research was conducted, The Heritage Foundation began an online database of its own sample of defensive gun use incidents (<https://datavisualizations.heritage.org/firearms/defensive-gun-uses-in-the-us>).

<sup>6</sup> Complaint, ¶¶6, 15.

<sup>7</sup> See, for example, NRA Civil Rights Defense Fund website, <http://www.nradefensefund.org/current-litigation.aspx>, accessed October 12, 2018.

<sup>8</sup> My collection and coding of the NRA Armed Citizen stories was last performed in mid-2017.

<sup>9</sup> The following incidents were excluded from the analysis: (1) duplicate incidents, (2) wild animal attacks, and (3) one incident where the supposed victim later pleaded guilty to covering up a murder. When the exact number of shots fired was not specified, we used the average for the most relevant incidents with known number of shots. For example, if the story stated that “shots were fired” this would indicate that at least two shots were fired and thus we used the average number of shots fired in all incidents in which two or more shots were fired and the number of shots was specified.

reported to have fired more than 10 bullets.<sup>10</sup> Defenders fired 2.2 shots on average.<sup>11</sup> In 18% of incidents the defender did not fire any shots; in 80% of incidents the defender fired 1 to 5 shots; in 2% of incidents the defender fired 6 to 10 shots; and in 0.3% of incidents the defender fired more than 10 shots.<sup>12, 13</sup> These incidents highlight the fact that in many instances defenders are able to defend themselves without firing any shots. For example, according to one of the incidents in the NRA Armed Citizen Database:

“A man entered a Shell station in New Orleans, La. and attempted to rob the cashier, by claiming he was carrying a gun. The cashier responded by retrieving a gun and leveling it at the thief, prompting the criminal to flee.

(The Times Picayune, New Orleans, La. 09/02/15)”<sup>14</sup>

12. The table below summarizes these findings. (Note that there were no incidents in the NRA Armed Citizen Database that occurred in Vermont)

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<sup>10</sup> Note that these two incidents with more than 10 bullets fired by the defender were added to the NRA Armed Citizen database in 2016 and 2017 after an earlier analysis that I had conducted of the database had been submitted to and cited by the Court in *Kolbe v. O'Malley*, Case No. CCB-13-2841 (Dkt. 79). In addition, according to the news stories on these two incidents, the defenders did not appear to need to fire more than 10 shots to defend themselves.

<sup>11</sup> Note that the analysis is focused on shots fired when using a gun in self-defense and therefore the average includes instances when no shots are fired. If one calculates the average excluding incidents of self-defense with a gun without firing shots, the average is still low, 2.6 shots when at least one shot is fired.

<sup>12</sup> The number of incidents, as well as the breakdown of incidents by number of shots fired, is similar for incidents inside the home vs. outside the home.

<sup>13</sup> A separate study of incidents in the NRA Armed Citizen database for an earlier period (the five-year period from 1997 through 2001) found similar results. Specifically, this study found that, on average, 2.2 shots were fired by defenders and that in 28% of incidents of armed citizens defending themselves the individuals fired no shots at all. See, Claude Werner, “The Armed Citizen – A Five Year Analysis,” <https://tacticalprofessor.files.wordpress.com/2014/12/tac-5-year-w-tables.pdf>, accessed January 26, 2023.

<sup>14</sup> “Gas station clerk scares off robber,” NRA-ILA Armed Citizen, September 9, 2015.

**Breakdown of Incidents in NRA Armed Citizen Database  
by Number of Shots Fired  
January 2011 - May 2017**

<u># of Shots Fired</u>	<u># of Incidents</u>	<u>% of Incidents</u>
0	134	18.2%
1-5	587	79.8%
6-10	13	1.8%
More than 10	2	0.3%

*Average Number of Shots Fired: 2.2*

**Notes and Sources:**

Data from NRA Armed Citizen database covering 736 incidents from January 2011 through May 2017. Excludes duplicate incidents, wild animal attacks and one incident where the supposed victim later pleaded guilty to covering up a murder.

## 2. Analysis of Factiva News Reports on Self-Defense with a Firearm

13. In addition to our analysis of incidents in the NRA Armed Citizen database, we performed a systematic, scientific study of news reports on incidents of self-defense with a firearm in the home, focusing on the same types of incidents as the NRA stories and covering the same time period.<sup>15</sup>

14. To identify relevant news stories to include in our analysis, we performed a comprehensive search of published news stories using Factiva, an online news reporting service and archive owned by Dow Jones, Inc. that aggregates news content from nearly 33,000 sources.<sup>16</sup> The search was designed to return stories about the types of incidents that are the focus of the NRA Armed Citizen database and that Plaintiffs claim the Vermont law impedes – in particular,

<sup>15</sup> This analysis was initially conducted to research issues regarding self-defense in the home, which was a focus of federal Second Amendment jurisprudence before the 2022 *New York State Rifle & Pistol Association v. Bruen* Supreme Court decision. The analysis of the NRA Armed Citizen incidents described above indicates that the number of shots fired in self-defense outside the home is similar to those inside the home.

<sup>16</sup> Factiva is often used for academic research. For example, a search for the term “Factiva” on Google Scholar yields over 28,000 results. As another example, a search on Westlaw yields at least 83 expert reports that conducted news searches using Factiva.



the use of firearms for self-defense.<sup>17</sup> The search identified all stories that contained the following keywords in the headline or lead paragraph: one or more words from “gun,” “shot,” “shoot,” “fire,” or “arm” (including variations on these keywords, such as “shooting” or “armed”), plus one or more words from “broke in,” “break in,” “broken into,” “breaking into,” “burglar,” “intruder,” or “invader” (including variations on these keywords) and one or more words from “home,” “apartment,” or “property” (including variations on these keywords).<sup>18</sup> The search criteria matched approximately 90% of the NRA stories on self-defense with a firearm in the home, and an analysis of the 10% of stories that are not returned by the search shows that the typical number of shots fired in these incidents was no different than in other incidents. The search covered the same period used in our analysis of incidents in the NRA Armed Citizen database (January 2011 to May 2017). The region for the Factiva search was set to “United States.” The search returned approximately 35,000 stories for the period January 2011 to May 2017.<sup>19</sup>

15. Using a random number generator, a random sample of 200 stories was selected for each calendar year, yielding 1,400 stories in total.<sup>20</sup> These 1,400 stories were reviewed to identify those stories that were relevant to the analysis, *i.e.*, incidents of self-defense with a firearm in or near the home. This methodology yielded a random selection of 200 news stories describing incidents of self-defense with a firearm in the home out of a population of approximately 4,800 relevant stories.<sup>21</sup> Thus, out of the over 70 million news stories aggregated

<sup>17</sup> NRA Institute for Legislative Action, Armed Citizen, <https://www.nraila.org/gun-laws/armed-citizen/>, accessed May 28, 2017. See, also, Complaint, ¶¶6, 15.

<sup>18</sup> The precise search string used was: (gun\* or shot\* or shoot\* or fire\* or arm\*) and (“broke in” or “break in” or “broken into” or “breaking into” or burglar\* or intrud\* or inva\*) and (home\* or “apartment” or “property”). An asterisk denotes a wildcard, meaning the search includes words which have any letters in place of the asterisk. For example, a search for shoot\* would return results including “shoots,” “shooter” and “shooting.” The search excluded duplicate stories classified as “similar” on Factiva.

<sup>19</sup> The effect of using alternative keywords was considered. For example, removing the second category (“broke in” or “break in” or “broken into” or “breaking into” or burglar\* or intrud\* or inva\*) and including incidents in which the assailant was already inside the home and/or was known to the victim was considered. *A priori*, there was no reason to believe that a larger number of shots would be used in these incidents and based on an analysis of the NRA stories we found that the number of shots fired in incidents when defending against someone already in the home was not different than those with an intruder.

<sup>20</sup> The random numbers were generated by sampling with replacement.

<sup>21</sup> The approximately 4,800 relevant news stories were estimated by calculating the proportion of relevant news stories from the 200 randomly selected stories each year and applying that proportion to the number of results returned by the search for each year of the analysis. For example, in 2017, 33 out of 200 (17%) randomly selected news stories

by Factiva between January 2011 and May 2017, approximately 4,800 news stories were on incidents of self-defense with a firearm in the home. We analyzed a random selection of 200 of these stories.

16. For each news story, the city/county, state and number of shots fired were tabulated. When tabulating the number of shots fired, we used the same methodology as we used to analyze stories in the NRA Armed Citizen database.<sup>22</sup> We then identified other stories describing the same incident on Factiva based on the date, location and other identifying information, and recorded the number of times that each incident was covered by Factiva news stories.

17. To determine the average number of shots fired *per incident*, we first determined the average number of shots fired *per story* and then analyzed the number of stories per incident. According to our study of a random selection from approximately 4,800 relevant stories on Factiva describing incidents of self-defense with a firearm in the home, the average number of shots fired per story was 2.61. This is not a measure of the average shots fired *per incident*, however, because the number of stories covering an incident varies, and the variation is not independent of the number of shots fired. We found that there was a statistically significant relationship between the number of shots fired in an incident and the number of news stories covering the incident.<sup>23</sup> We found that on average the more shots fired in a defensive gun use incident, the greater the number of stories covering the incident. For example, as shown in the chart below, we found that incidents in Factiva news stories with zero shots fired were covered

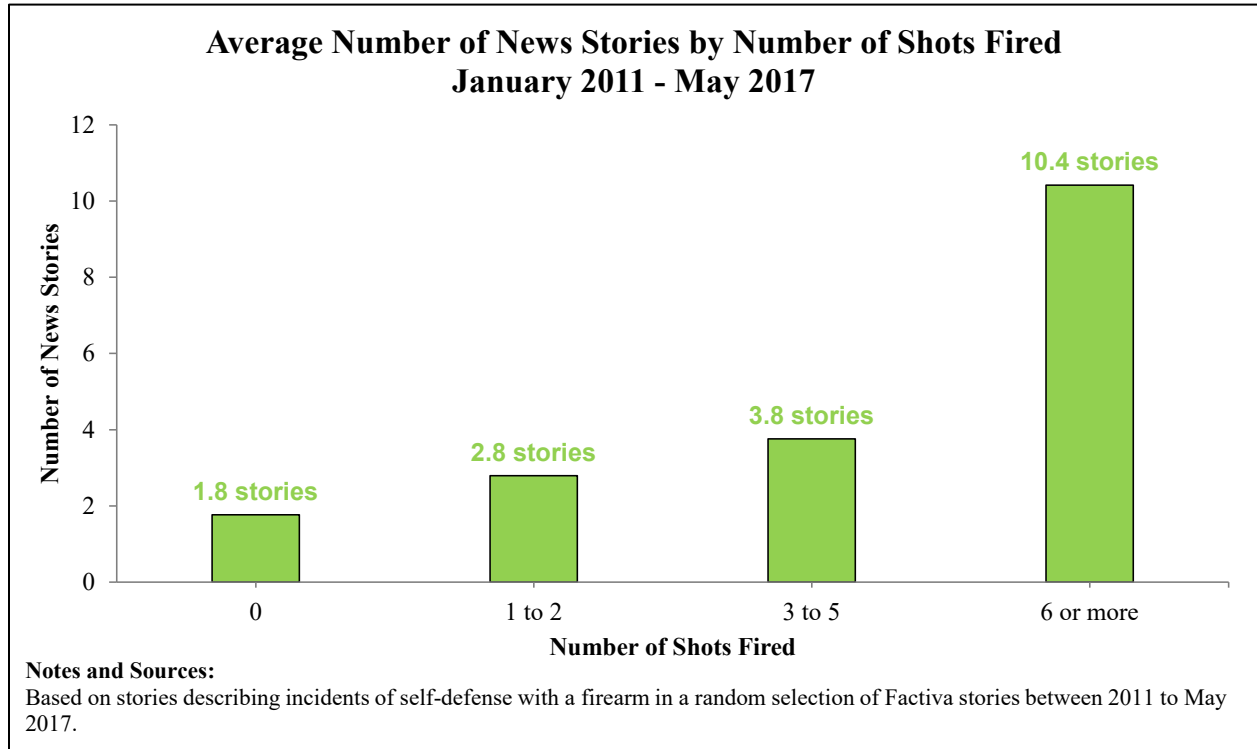
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involved incidents of self-defense with a firearm in the home. Applying that proportion to the 1,595 results from the Factiva search in 2017 yields 263 relevant news stories in 2017. This process was repeated every year to arrive at a total of 4,841 relevant news stories from 2011-2017.

<sup>22</sup> When the exact number of shots fired was not specified, we used the average for the most relevant incidents with known number of shots. For example, if the story stated that “shots were fired” this would indicate that at least two shots were fired and thus we used the average number of shots fired in all incidents in which two or more shots were fired and the number of shots was specified.

<sup>23</sup> Based on a linear regression of the number of news stories as a function of the number of shots fired, the results were statistically significant at the 1% level (more stringent than the 5% level commonly used by academics and accepted by courts). See, for example, Freedman, David A., and David H. Kaye, “Reference Guide on Statistics,” *Reference Manual on Scientific Evidence* (Washington, D.C.: The National Academies Press, 3rd ed., 2011), pp. 211-302, and Fisher, Franklin M., “Multiple Regression in Legal Proceedings,” 80 *Columbia Law Review* 702 (1980).

on average by 1.8 news stories, while incidents with six or more shots fired were covered on average by 10.4 different news stories.



18. After adjusting for this disparity in news coverage, we find that the average number of shots fired per incident covered is 2.34.<sup>24</sup> Note that this adjustment does not take into account the fact that some defensive gun use incidents may not be picked up by *any* news story. Given the observed relationship that there are more news stories when there are more shots fired, one would expect that the incidents that are not written about would on average have fewer shots

<sup>24</sup> The adjustment reflects the probability that a news story on a particular incident would be selected at random from the total population of news stories on incidents of self-defense with a firearm in the home. The formula used for the adjustment is:

$$\frac{\sum_{i=1}^n \left( \text{Shots Fired}_i \times \frac{R_i}{C_i} \right)}{\sum_{i=1}^n \left( \frac{R_i}{C_i} \right)}$$

where:

$n$  = random selection of news stories on incidents of self-defense with a firearm in the home

$R_i$  = number of search results on Factiva in the calendar year of incident  $i$

$C_i$  = number of news stories covering incident  $i$

than those with news stories. Therefore, the expectation is that these results, even after the adjustment, are biased upward (*i.e.*, estimating too high an average number of shots and underestimating the percent of incidents in which no shots were fired).

19. As shown in the table below, according to the study of Factiva news stories, in 11.6% of incidents the defender did not fire any shots, and simply threatened the offender with a gun. In 97.3% of incidents the defender fired five or fewer shots. There were no incidents where the defender was reported to have fired more than 10 bullets.

**Number of Shots Fired in Self-Defense in the Home  
Based on Random Selection of Articles from Factiva  
January 2011 - May 2017**

	<u>Incidents in the Home</u>
Estimated population of news reports in Factiva on self-defense with a firearm in the home	4,841
Random selection of news reports	200
Average Number of Shots Fired	2.34
Median Number of Shots Fired	2.03
Number of Incidents with No Shots Fired	23
Percent of Incidents with No Shots Fired	11.6%
Number of Incidents with <=5 Shots Fired	195
Percent of Incidents with <=5 Shots Fired	97.3%
Number of Incidents with >10 Shots Fired	0
Percent of Incidents with >10 Shots Fired	0.0%

**Notes and Sources:**

Based on news stories describing defensive gun use in a random selection of Factiva stories 2011 to May 2017 using search string (gun\* or shot\* or shoot\* or fire\* or arm\*) and ("broke in" or "break in" or "broken into" or "breaking into" or burglar\* or intrud\* or inva\*) and (home\* or "apartment" or "property") with region set to United States and excluding duplicate stories classified as "similar."

Calculated using weights reflecting the probability that a news story on a particular incident would be selected at random from the total population of news stories on incidents of self-defense with a firearm in the home.

### 3. Analysis of Shooting Incidents and Crime Data from the Portland Police

20. We used publicly available data from the Portland Police Bureau on shooting incidents and crime covering a four-year period from 2019-2022 in Portland, Oregon to identify any incidents of self-defense with a firearm where more than 10 rounds were fired by the defender.<sup>25</sup>

21. In particular, we analyzed data from the Portland Police on shooting incidents from the “Portland Shooting Incident Statistics Database,” (the “Portland Shootings Database”) and criminal offenses from the “Monthly Portland Neighborhood Offense Statistics Database,” (the “Portland Crime Database”). The Portland Shootings Database has information on 3,956 shooting incidents in Portland from 2019-2022, including the location, time, and number of bullet casings associated with each incident.<sup>26</sup> The Portland Crime Database has information on 252,932 criminal offenses in Portland from 2019-2022, including the location, time, and type of offense for each incident.<sup>27</sup>

22. To identify incidents where more than 10 rounds could have been fired by the defender, we focused on shooting incidents with more than 10 casings from the Portland Police data. We collected and reviewed news stories on these incidents to determine if any incident involved a situation of self-defense with a firearm and, if so, the number of shots fired by the defender.<sup>28</sup>

23. According to this analysis, we found no incidents of self-defense with a firearm where the defender fired more than 10 shots. Out of the 3,956 shooting incidents in the Portland Police data, 2,632 were associated with a criminal offense.<sup>29</sup> Out of those 2,632 shooting

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<sup>25</sup> Data was not publicly available on casings for shooting incidents in any city in Vermont.

<sup>26</sup> The Portland Shootings Database contains “shooting incidents where a firearm was discharged and reported to the Portland Police Bureau.” “Portland Shooting Incident Statistics,” *Portland Police Bureau*, <https://www.portland.gov/police/open-data/shooting-incident-statistics>, accessed August 30, 2023

<sup>27</sup> The Portland Crime Database contains “offenses that are reported to the Portland Police Bureau.” “Monthly Portland Neighborhood Offense Statistics,” *Portland Police Bureau*, <https://www.portland.gov/police/open-data/crime-statistics>, accessed August 30, 2023.

<sup>28</sup> News stories from Factiva and Google.

<sup>29</sup> Based on shooting incidents in the Portland Shootings Database that match to at least one criminal offense in the Portland Crime Database based on the address, neighborhood, date and time information in both datasets. According to the Portland Police, shooting incidents that are not associated with a criminal offense include, for example,

incidents, 398 had more than 10 casings. Of the 398 shooting incidents with more than 10 casings, only one involved a potential situation of self-defense with a firearm. News stories covering that incident indicate that the defender fired only four or five shots and that the offender fired the additional shots.<sup>30</sup> The table below summarizes these results:

<b>Summary of Portland Police Data Analysis 2019-2022</b>	
<b>Item</b>	<b>Shootings</b>
Shootings in Portland	3,956
No crime	1,324
Crime	2,632
10 or fewer casings	2,234
More than 10 casings	398
Potential self-defense with firearm	1
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>Potential self-defense with firearm and more than 10 shots fired by defender</b> </div>	
	<b>0</b>
<b>Sources:</b>	
Data from the Portland Police Bureau's databases	
“Portland Shooting Incident Statistics” and	
“Monthly Portland Neighborhood Offense	
Statistics.”	

24. In sum, an analysis of police data on almost 4,000 shooting incidents in Portland yielded no incidents of self-defense with a firearm where the defender fired more than 10 rounds.

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reports of shots fired to the police that are associated with a non-criminal offense such as target practice. Shooting incidents associated with criminal offenses of only “Weapons Law Violation” or only “Vandalism” are assumed not to involve situations of self-defense and thus were excluded from the news search.

<sup>30</sup> According to the news stories, a group of eight men attacked two people leaving a bar when a bystander intervened and fired four or five shots into the air. One of the eight men returned fire, injuring at least one of the two victims. According to a victim in the case, the bystander “tried to intervene and it just made it absolutely so much worse...” See, “30 seconds changed my life: Portland woman shot on street,” *KOIN.com*, November 2, 2021, “1 woman shot, another assaulted in Southwest Portland,” *KPTV*, July 3, 2021, and “Woman shot, another assaulted in downtown Portland,” *KOIN 6 News*, July 3, 2021.

25. In addition, we used the Portland Shootings Database to conduct an analysis of the difference in shooting incidents covered by news stories versus those not covered by news stories. We found that on average shooting incidents covered by news stories are more serious with greater injury and death and have more casings than incidents not covered by news stories.

26. To conduct the analysis we searched for news stories covering the shooting incidents in the Portland Shooting Database and identified the first 100 shooting incidents that had news stories covering them and the first 100 shooting incidents in the Portland data for which we could not find any news coverage.<sup>31</sup> Then, we analyzed the differences in injury outcomes (as reported in the Portland Police data) for shooting incidents covered by news stories versus those not covered by news stories. We found that 100% of shooting incidents involving a homicide and 70% involving a non-fatal injury were covered by news stories, while only 32% of shooting incidents with no injury were covered by news. The table below summarizes these results:

<b>Shooting Incidents Covered by News vs. No News by Injury Type</b>			
<b>Shooting Incidents with</b>	<b>Homicide</b>	<b>Non-Fatal Injury</b>	<b>No Injury</b>
News	100%	70%	32%
No News	0%	30%	68%
<b>Notes and Sources:</b>			
Data on shootings and injury type from the Portland Police Bureau.			
News search conducted using Factiva and Google.			

27. Further, we analyzed the number of casings reported by the Portland Police data for shooting incidents covered by news stories versus those not covered by news stories. We found that the number of casings for shooting incidents with news reports was substantially higher than the number of casings for shooting incidents not covered by the news. In particular,

<sup>31</sup> News stories from Factiva and Google. Shooting incidents were reviewed in order based on each shooting's "Incident Number." Shootings associated with criminal offenses of only "Weapons Law Violation" or only "Vandalism" were excluded.

we found that the average number of casings for shooting incidents covered by news was 8.1 vs. 5.3 for shooting incidents without news coverage.<sup>32</sup> Similarly, we found that the median number of casings was substantially higher for shootings covered by the news, 5 vs 3. The table below summarizes these results:

**Number of Casings for Shooting Incidents  
Covered by News vs. No News**

<b><u>Shooting Incidents with</u></b>	<b><u>Number of Casings</u></b>	
	<b><u>Mean</u></b>	<b><u>Median</u></b>
News	8.1	5.0
No News	5.3	3.0

**Notes and Sources:**

Data on shootings and casings from the Portland Police Bureau. News search conducted using Factiva and Google. Excludes incidents with 0 casings.

28. In sum, we find that the shooting incidents covered by news stories have more shots fired or casings and worse outcomes than those not covered by news stories. These findings, which are based on actual police data for incidents not covered by news, indicate that our analyses of the NRA Armed Citizen database and Factiva news reports are likely overestimating the number of shots fired in self-defense. This is because incidents that are not covered by news stories, and thus not part of the NRA Armed Citizen and Factiva analyses, are less serious and have fewer casings, and would likely involve fewer shots fired in self-defense.

29. Overall, an analysis of incidents in the NRA Armed Citizen database, our own study of a random sample from approximately 4,800 news stories describing incidents of self-defense with a firearm, and a systematic analysis of shootings in Portland using police data, indicates that it is extremely rare for a person, when using a firearm in self-defense, to fire more

<sup>32</sup> Note that these averages are not averages specific to incidents of self-defense, but rather to all types of shooting incidents in the Portland Shooting Database associated with criminal offenses.



than 10 rounds. I have analyzed almost 1,000 incidents of self-defense (736 incidents from the NRA Armed Citizen database and 200 stories from Factiva) and in only 2 incidents were more than 10 rounds used, a rate of 0.2%. However, given that this rate excludes incidents with no news coverage, the 0.2% rate is an overestimation of the percent of self-defense incidents in which more than 10 rounds were used because fewer shots means less news coverage.<sup>33</sup> In addition, I analyzed police data on almost 4,000 shooting incidents in Portland and found no incidents of self-defense with a firearm where the defender fired more than 10 rounds.

## **B. Public Mass Shootings**

30. We analyzed the use of large-capacity magazines in public mass shootings using four sources for identifying public mass shootings: Mother Jones,<sup>34</sup> the Citizens Crime Commission of New York City,<sup>35</sup> The Washington Post,<sup>36</sup> and The Violence Project.<sup>37, 38</sup> The analysis focused on public mass shootings because it is my understanding that the State of

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<sup>33</sup> As discussed above, the two incidents with more than 10 shots fired by the defender were added to the NRA Armed Citizen database after an earlier analysis that I had conducted of the database. Further, the defenders in these two incidents did not appear to need to fire more than 10 shots to defend themselves. See footnote 1 above.

<sup>34</sup> “US Mass Shootings, 1982-2022: Data From Mother Jones’ Investigation,” Mother Jones, updated November 23, 2022, <http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data>.

<sup>35</sup> “Mayhem Multiplied: Mass Shooters and Assault Weapons,” Citizens Crime Commission of New York City, February 2018 update. Additional details on the mass shootings were obtained from an earlier source by the Citizens Crime Commission. “Mass Shooting Incidents in America (1984-2012),” Citizens Crime Commission of New York City, <http://www.nycrimecommission.org/mass-shooting-incidents-america.php>, accessed June 1, 2017.

<sup>36</sup> “The terrible numbers that grow with each mass shooting,” The Washington Post, updated May 12, 2021, <https://www.washingtonpost.com/graphics/2018/national/mass-shootings-in-america/>.

<sup>37</sup> “Mass Shooter Database,” The Violence Project, updated May 14, 2022.

<sup>38</sup> When I began research in 2013 on mass shootings, I found Mother Jones and Citizens Crime Commission to maintain the most comprehensive lists of relevant mass shootings. More recently, two additional sources, The Washington Post and The Violence Project, have compiled lists of public mass shootings. The Violence Project began work on its mass shootings database in September 2017 and its database first went online in November 2019, while The Washington Post first published its mass shootings database on February 14, 2018. There is substantial overlap between the mass shootings in all four sources. For example, the Mother Jones data contains 93% of the mass shootings in the Citizens Crime Commission data for the years covered by both data sources, 1984 to 2016, while The Washington Post contains 94% of the mass shootings in The Violence Project data for the years covered by both data sources, 1966 to 2019.

Vermont is concerned about public mass shootings and enacted the challenged law, in part, to address the problem of public mass shootings.<sup>39</sup>

31. The type of incident considered a mass shooting is generally consistent across the four sources: all four sources consider an event a mass shooting if four or more people were killed in a public place in one incident, excluding incidents involving other criminal activity such as a robbery.<sup>40</sup>

32. Each of the four sources contains data on mass shootings covering different time periods. The Mother Jones data covers 112 mass shootings from 1982 to October 13, 2022,<sup>41</sup> the

<sup>39</sup> See, for example, “Governor Phil Scott Signs Violence Reduction & Gun Safety Legislation,” *Office of the Governor Phil Scott*, April 11, 2018.

<sup>40</sup> Citizens Crime Commission describes a mass shooting as “four or more victims killed” in “a public place” that were “unrelated to another crime (e.g., robbery, domestic violence).” Citizens Crime Commission notes that its sources include “news reports and lists created by government entities and advocacy groups.” “Mayhem Multiplied: Mass Shooters and Assault Weapons,” Citizens Crime Commission of New York City, February 2018 update.

Mother Jones describes mass shootings as “indiscriminate rampages in public places resulting in four or more victims killed by the attacker,” excluding “shootings stemming from more conventionally motivated crimes such as armed robbery or gang violence.” Although in January 2013 Mother Jones changed its definition of mass shooting to include instances when three or more people were killed, for this declaration we only analyzed mass shootings where four or more were killed to be consistent with the definition of the other three sources. “A Guide to Mass Shootings in America,” Mother Jones, updated November 23, 2022, <http://www.motherjones.com/politics/2012/07/mass-shootings-map>. See also, “What Exactly is a Mass Shooting,” Mother Jones, August 24, 2012. <http://www.motherjones.com/mojo/2012/08/what-is-a-mass-shooting>.

The Washington Post describes a mass shooting as “four or more people were killed, usually by a lone shooter,” excluding “shootings tied to robberies that went awry” and “domestic shootings that took place exclusively in private homes.” The Washington Post notes that its sources include “Grant Duwe, author of ‘Mass Murder in the United States: A History,’ Mother Jones and Washington Post research,” as well as “Violence Policy Center, Gun Violence Archive; FBI 2014 Study of Active Shooter Incidents; published reports.” “The terrible numbers that grow with each mass shooting,”

The Washington Post, updated May 12, 2021, <https://www.washingtonpost.com/graphics/2018/national/mass-shootings-in-america/>.

The Violence Project indicates that it uses the Congressional Research Service definition of a mass shooting: “a multiple homicide incident in which four or more victims are murdered with firearms—not including the offender(s)—within one event, and at least some of the murders occurred in a public location or locations in close geographical proximity (e.g., a workplace, school, restaurant, or other public settings), and the murders are not attributable to any other underlying criminal activity or commonplace circumstance (armed robbery, criminal competition, insurance fraud, argument, or romantic triangle).” The Violence Project notes that its sources include “Primary Sources: Written journals / ‘manifestos’ / suicide notes etc., Social media and blog posts, Audio and video recordings, Interview transcripts, Personal correspondence with perpetrators” as well as “Secondary Sources (all publicly available): Media (television, newspapers, magazines), Documentary films, Biographies, Monographs, Peer-reviewed journal articles, Court transcripts, Law Enforcement records, Medical records, School records, Autopsy reports.” “Mass Shooter Database,” The Violence Project, accessed January 17, 2020.

<sup>41</sup> “A Guide to Mass Shootings in America,” Mother Jones, updated November 23, 2022, <http://www.motherjones.com/politics/2012/07/mass-shootings-map>. Excludes mass shootings where only three people were killed. Note this analysis of the Mother Jones data may not match other analyses because Mother Jones periodically updates its historical data.

Citizens Crime Commission data covers 80 mass shootings from 1984 to February 2018,<sup>42</sup> The Washington Post data covers 185 mass shootings from 1966 to May 12, 2021,<sup>43</sup> and The Violence Project data covers 182 mass shootings from 1966 to May 14, 2022.<sup>44, 45</sup>

33. Note that the two more recently compiled sources of mass shootings, The Washington Post and The Violence Project, include additional mass shootings that were not covered by either Mother Jones or Citizens Crime Commission. In general, we found that these additional mass shootings were less covered by the media and involved fewer fatalities and/or injuries than the ones previously identified by Mother Jones or Citizens Crime Commission. For example, using the mass shooting data for the period 1982 through 2019, we found that the median number of news stories for a mass shooting included in Mother Jones and/or Citizens Crime Commission was 317, while the median for the additional mass shootings identified in The Washington Post and/or The Violence Project was 28.<sup>46</sup> In addition, using the mass shooting data through 2019, we found an average of 21 fatalities or injuries for a mass shooting included in Mother Jones and/or Citizens Crime Commission, while only 6 fatalities or injuries for the additional mass shootings identified in The Washington Post and/or The Violence Project.

34. We combined the data from the four sources for the period 1982 through October 2022, and searched news stories on each mass shooting to obtain additional details on the types

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<sup>42</sup> “Mayhem Multiplied: Mass Shooters and Assault Weapons,” *Citizens Crime Commission of New York City*, February 2018 update.

<sup>43</sup> “The terrible numbers that grow with each mass shooting,” *The Washington Post*, updated May 12, 2021, <https://www.washingtonpost.com/graphics/2018/national/mass-shootings-in-america/>.

<sup>44</sup> “Mass Shooter Database,” *The Violence Project*, updated May 14, 2022.

<sup>45</sup> Note that I have updated this mass shooting analysis to include more recent incidents, as well as more recently available details. In my 2017 declaration in *Duncan v. Bonta*, I included data on mass shootings through April 2017. In my 2018 declaration in *Rupp v. Becerra*, I updated the analysis to include data on mass shootings through September 2018. The analyses in both of these declarations included mass shootings only from Mother Jones and the Citizens Crime Commission. In my 2020 declaration in *James Miller v. Becerra*, I updated the analysis to include mass shootings through December 2019 and added mass shootings from two more sources, The Washington Post and The Violence Project. The number of mass shootings, as well as some details about the shootings, are not identical across these declarations for three main reasons. First, I have updated the analysis to include more recent incidents as well as more recently available details. Second, starting in 2020, I added two more sources (The Washington Post and The Violence Project), which include additional mass shootings and details not included in the initial sources. Third, even though Mother Jones included instances when three or more people were killed, for my declarations and reports starting in 2020, I only included mass shootings where four or more were killed to be consistent with the definition of the other three sources.

<sup>46</sup> The search was conducted over all published news stories on Factiva. The search was based on the shooter’s name and the location of the incident over the period from one week prior to three months following each mass shooting.

of weapons used and data on shots fired where available. We identified, based on this publicly available information, which mass shootings involved the use of large-capacity magazines. See attached Exhibit B for a summary of the combined data based on Mother Jones, Citizens Crime Commission, The Washington Post, The Violence Project, and news reports.<sup>47</sup>

### **1. Use of large-capacity magazines in public mass shootings**

35. Based on the 179 mass shootings through October 2022, we found that large-capacity magazines (those with a capacity to hold more than 10 rounds of ammunition) are often used in public mass shootings. Magazine capacity is known in 115 out of the 179 mass shootings (or 64%) considered in this analysis. Out of the 115 mass shootings with known magazine capacity, 73 (or 63%) involved large-capacity magazines. Even assuming the mass shootings with unknown magazine capacity *all* did not involve large-capacity magazines, 73 out of 179 mass shootings or 41% of mass shootings involved large capacity magazines.

### **2. Casualties in mass shootings involving large-capacity magazines**

36. Based on our analysis of the public mass shootings data, casualties were higher in the mass shootings that involved weapons with large-capacity magazines than in other mass shootings. In particular, we found that the average number of fatalities or injuries per mass shooting with a large-capacity magazine was 25 versus 9 for mass shootings where a large-capacity magazine was not used. Focusing on just fatalities, we found that the average number of fatalities per mass shooting with a large-capacity magazine was 10 versus 6 for those without. (See table below.)

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<sup>47</sup> Note that the Citizens Crime Commission data was last updated in February 2018 and The Washington Post was last updated in May 2021.

**Numbers of Fatalities and Injuries  
In Public Mass Shootings  
January 1982 - October 2022**

<b>Weapon Used</b>	<b># Mass Shootings</b>	<b>Average # of</b>		
		<b>Fatalities</b>	<b>Injuries</b>	<b>Total</b>
Large-Cap. Mag.	73	10	16	25
No Large-Cap. Mag.	42	6	3	9
Unknown	64	5	3	7

**Notes and Sources:**

Casualty figures exclude the shooter. Large-capacity magazine classification and casualties based on review of stories from Factiva/Google searches.

37. Our results are consistent with those of other studies that have analyzed mass shootings. Importantly, although the other studies are based on alternate sets of mass shootings, including covering different years and defining mass shootings somewhat differently, the results are consistent in finding that the number of fatalities and injuries is greater in mass shootings in which large capacity magazines are involved. A 2019 academic article published in the *American Journal of Public Health* by Klarevas, et al. found that “[a]ttacks involving LCMs resulted in a 62% higher mean average death toll.”<sup>48</sup> This study found an average number of fatalities of 11.8 per mass shooting with a large-capacity magazine versus 7.3 for those without. The results in this study were based on 69 mass shootings between 1990 and 2017.<sup>49</sup> An analysis of the mass shootings detailed in a 2016 article by Gary Kleck yielded similar results: 21 average fatalities or injuries in mass shootings involving large-capacity magazines versus 8 for those without.<sup>50</sup> The

<sup>48</sup> Louis Klarevas, Andrew Conner, and David Hemenway, “The Effect of Large-Capacity Magazine Bans on High-Fatality Mass Shootings, 1990–2017,” *American Journal of Public Health* (2019).

<sup>49</sup> The Klarevas, et al. study defines mass shootings as “intentional crimes of gun violence with 6 or more victims shot to death, not including the perpetrators” and, unlike my analysis, does not exclude incidents in private places or incidents involving other criminal activity such as robbery.

<sup>50</sup> Kleck, Gary, “Large-Capacity Magazines and the Casualty Counts in Mass Shootings: The Plausibility of Linkages,” 17 *Justice Research and Policy* 28 (2016).

Kleck study covered 88 mass shooting incidents between 1994 and 2013.<sup>51</sup> In a 2018 study, Koper et al. found that mass shootings involving assault weapons and large-capacity magazines resulted in an average of 13.7 victims versus 5.2 for other cases.<sup>52</sup> The Koper et al. study covered 145 mass shootings between 2009 and 2015.<sup>53</sup> The table below summarizes their results.

Comparison of Studies on the Use of Large-Capacity Magazines in Mass Shootings						
Source	# Victims	Criteria	Time Period	# of Incidents	Avg. # of Fatalities + Injuries / Fatalities	
		Other Criteria			With LCM	Without LCM
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Allen (2024) <sup>1</sup>	at least 4 killed <sup>3</sup>	Includes shootings "in a public place in one incident, and exclude[s] incidents involving other criminal activity such as a robbery"	1982-October 2022	179	25 / 10	9 / 6
Allen (2020) <sup>2</sup>			1982-2019	161	27 / 10	9 / 6
Kleck et al. (2016) <sup>4</sup>	more than 6 shot	Excludes "spree shootings" and includes shootings in both "public" and "private" places	1994-2013	88	21 / n/a	8 / n/a
Klarevas et al. (2019) <sup>5</sup>	at least 6 killed <sup>3</sup>	Includes "intentional crimes of gun violence"	1990-2017	69	n/a / 12	n/a / 7
Koper et al. (2018) <sup>6</sup>	at least 4 killed <sup>3</sup>	Includes shootings in both public and private places	2009-2015	145	14 / n/a	5 / n/a

**Notes and Sources:**

<sup>1</sup> Exhibit B of this report

<sup>2</sup> Declaration of Lucy P. Allen in Support of Defendants' Opposition to Motion for Preliminary Injunction in *James Miller et al. v. Xavier Becerra et al.*, dated January 23, 2020.

<sup>3</sup> Excluding shooter.

<sup>4</sup> Kleck, Gary, "Large-Capacity Magazines and the Casualty Counts in Mass Shootings: The Plausibility of Linkages," 17 *Justice Research and Policy* 28 (2016).

<sup>5</sup> Klarevas et al., "The Effect of Large-Capacity Magazine Bans on High-Fatality Mass Shootings 1990-2017," *American Journal of Public Health* (2019).

<sup>6</sup> Koper et al., "Criminal Use of Assault Weapons and High-Capacity Semiautomatic Firearms: an Updated Examination of Local and National Sources," *Journal of Urban Health* (2018). Note that the Koper et al study includes shootings involving both LCM and assault weapons.

<sup>51</sup> The Kleck study defines a mass shooting as "one in which more than six people were shot, either fatally or nonfatally, in a single incident." See, Kleck, Gary, "Large-Capacity Magazines and the Casualty Counts in Mass Shootings: The Plausibility of Linkages," 17 *Justice Research and Policy* 28 (2016).

<sup>52</sup> Koper et al., "Criminal Use of Assault Weapons and High-Capacity Semiautomatic Firearms: an Updated Examination of Local and National Sources," *Journal of Urban Health* (2018).

<sup>53</sup> The Koper et al. study defined mass shootings as "incidents in which four or more people were murdered with a firearm, not including the death of the shooter if applicable and irrespective of the number of additional victims shot but not killed."

### **3. The number of rounds fired in public mass shootings with large-capacity magazines**

38. The data on public mass shootings indicates that it is common for offenders to fire more than 10 rounds when using a gun with a large-capacity magazine in mass shootings. Of the 73 mass shootings we analyzed that are known to have involved a large-capacity magazine, there are 49 in which the number of shots fired is known. Shooters fired more than 10 rounds in 46 of the 49 (or 94%) incidents, and the average number of shots fired was 99. In contrast, the average number of shots fired in mass shootings that did not involve a large-capacity magazine was 16.

### **4. The percent of mass shooters' guns legally obtained**

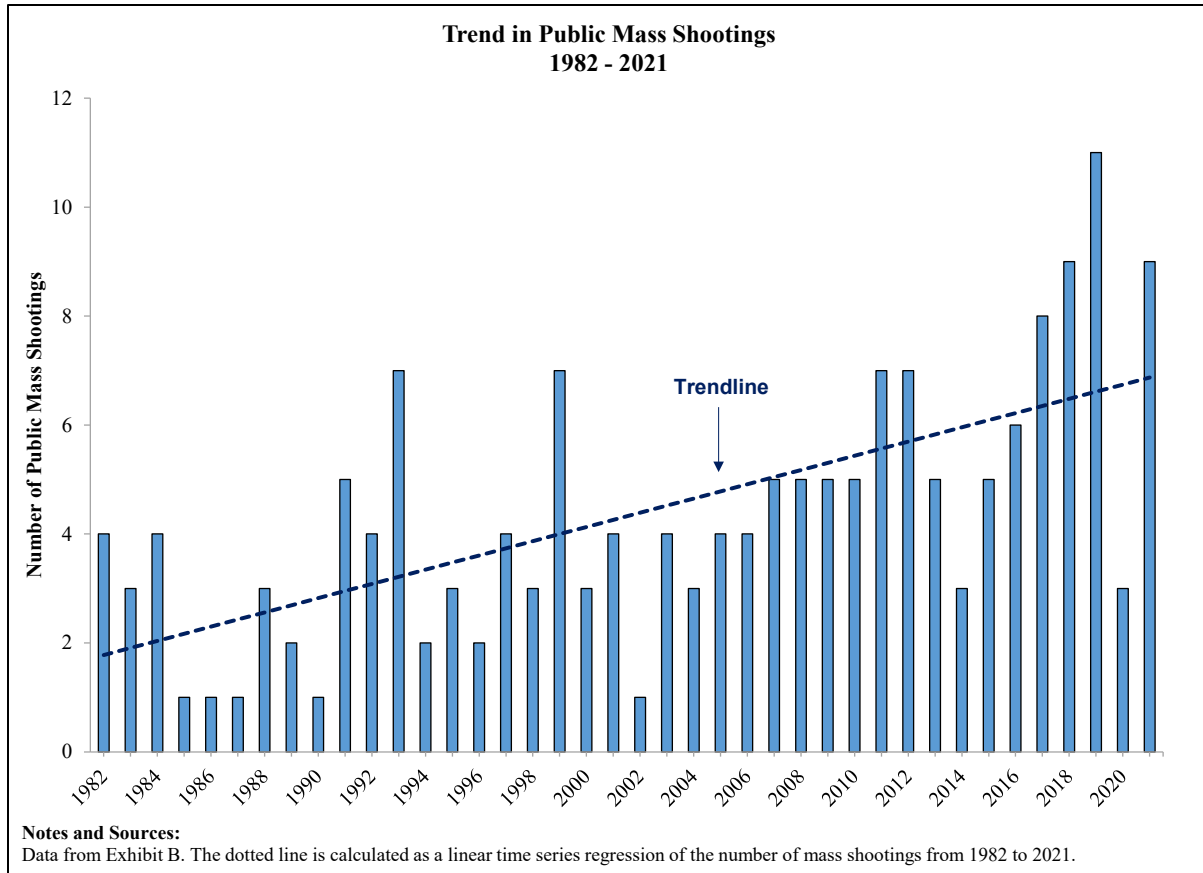
39. The data on public mass shootings indicates that the majority of guns used in these mass shootings were obtained legally.<sup>54</sup> Of the 179 mass shootings analyzed through October 2022, there are 112 where it can be determined whether the gun was obtained legally. According to the data, shooters in 79% of mass shootings obtained their guns legally (89 of the 112 mass shootings) and 80% of the guns used in these 112 mass shootings were obtained legally (202 of the 252 guns). (Even if one assumed that the guns were illegally obtained in all of the mass shootings where this question of legality is unknown, then one would find that in 50% of the mass shootings the guns were obtained legally and that 62% of the guns themselves were obtained legally.)

### **5. Trends in the number of mass shootings**

40. According to the data since 1982, the first year in our analysis, the number of public mass shootings per year has been increasing. The following chart shows the number of mass shootings per year during this period, along with a fitted trendline:

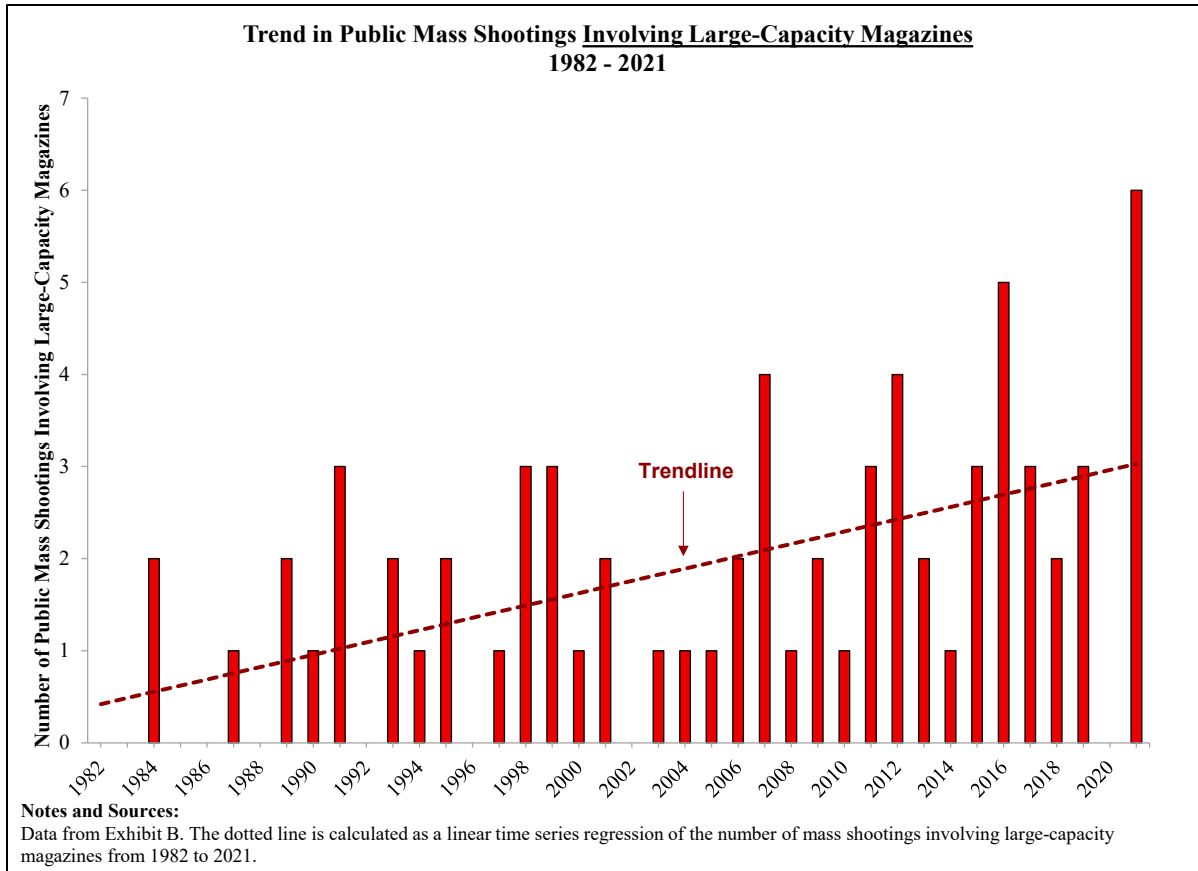
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<sup>54</sup> The determination of whether guns were obtained legally is based on Mother Jones and The Washington Post reporting.



41. Focusing only on public mass shootings involving large-capacity magazines, the data similarly shows that the number of public mass shootings with large-capacity magazines has been increasing. The following chart shows the number of public mass shootings involving large-capacity magazines per year, along with a fitted trendline:





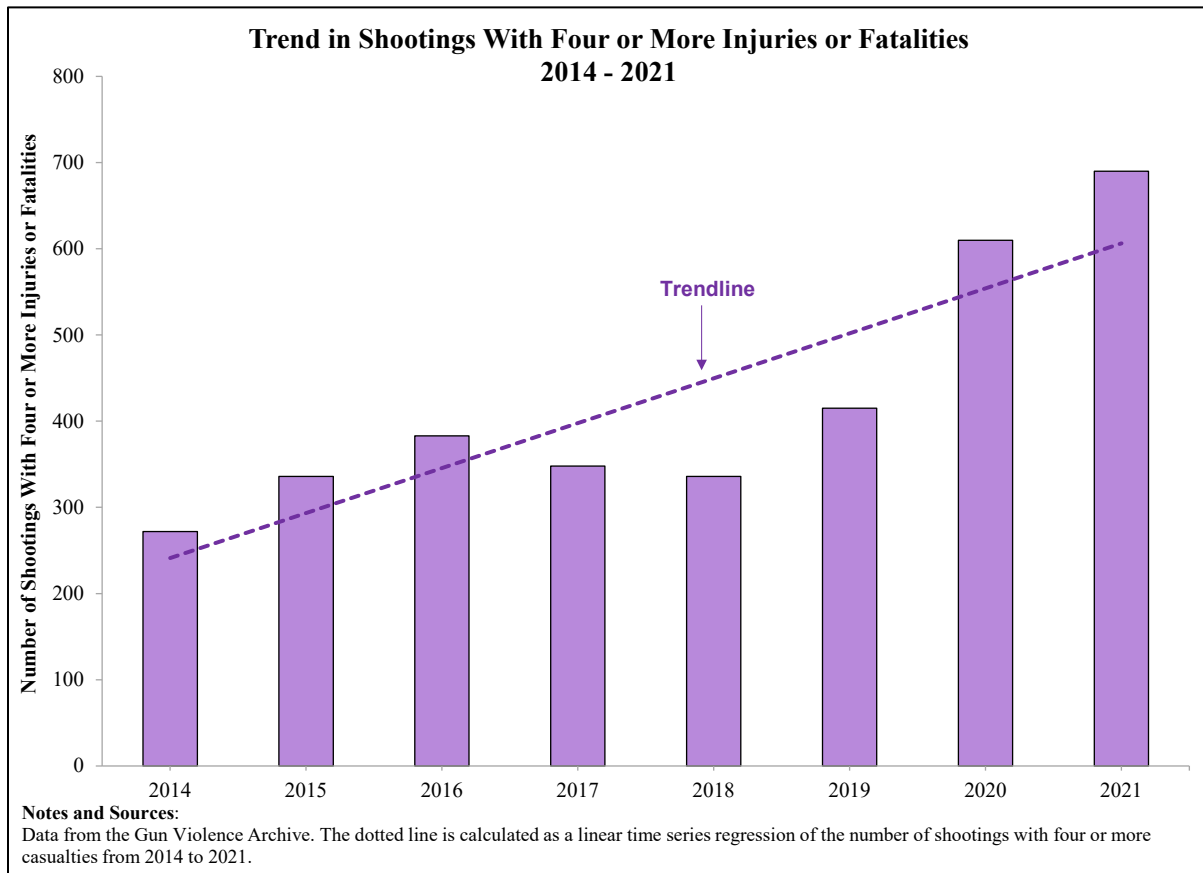
42. Focusing on a broader set of shooting incidents also shows an upward trend over time. In particular, data from the Gun Violence Archive (“GVA”) on shootings in which four or more victims were killed *or injured* in either a public place *or a home* shows that the number of shooting incidents within this broader category has also been increasing.<sup>55</sup> GVA maintains a “database of incidents of gun violence and gun crime,” based on information from “police, media, data aggregates, government and other sources” and has data starting in 2014.<sup>56</sup> Note that the data indicates there is less news coverage for this broader set of shooting incidents versus public mass shootings and thus less information about the type of magazine used.<sup>57</sup> The

<sup>55</sup> “General Methodology,” *Gun Violence Archive Website*, accessed on April 19, 2023.

<sup>56</sup> “General Methodology,” *Gun Violence Archive Website*, accessed on April 19, 2023.

<sup>57</sup> Analysis of the number of news stories covering shootings indicated that there is more news coverage on public mass shootings than mass shootings in the home. For example, our analysis indicated that the median number of news stories covering public mass shootings is approximately four times larger than for mass shootings in the home. See “Declaration of Lucy P. Allen,” dated February 6, 2023, in *Oregon Firearms Federation, Inc., et al., v. Tina Kotek, et al.* In addition, the data indicates that when fatalities and/or casualties are higher there is more news coverage. For example, our analysis indicates that there are approximately four times more news stories covering mass shootings with six or more fatalities than those with fewer than six fatalities.

following chart shows the number of shootings with four or more fatalities or injuries per year according to the GVA data, along with a fitted trendline:



I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 20<sup>th</sup> day of February 2024, in New York, NY.

/s/ Lucy P. Allen

Lucy P. Allen